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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YOSHINORI KAMI
and Hideaki Ishii

Appeal 2010-003697
Application 09/530,447
Technology Center 1700

Before BRADLEY R. GARRIS, MARK NAGUMO, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

A. Introduction[1]

Yoshinori Kami and Hideaki Ishii ("Kami") timely appeal under 35 U.S.C. § 134(a) from the final rejection[2] of claims 9-20, which are all of the pending claims. We have jurisdiction. 35 U.S.C. § 6. We REVERSE for the reasons well-stated by Kami.

The subject matter on appeal relates to an airbag for the protection of occupants in a vehicle during a collision. The 447 Specification teaches that fabrics for air bags must have "good foldability" in order to be packed into a small volume, such as a steering wheel (Spec. 1, ll. 23-24), as well as durability and excellent mechanical properties in order to be deployed suddenly in a collision (*id.* at ll. 19-23). Moreover, the fabrics must not be too heavy or rigid, or they will injure the vehicle occupants intended to be protected. (*Id.* at 1, l. 35, to 2, l. 3.) To attain these goals, according to the 447 Specification, thinner yarns of 350 to 233 decitex have been used, but proved to be insufficient to obtain the desired thickness and weight reductions. (*Id.* at 2, ll. 15-20.) Much finer decitex materials, e.g., 50 decitex nylon yarns, yielded fabrics lacking adequate tensile strength. (*Id.* at ll. 23-35.)

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[1] Application 09/530,447, *Air Bag*, filed 28 April 2000, as the International Stage of a PCT application filed 30 October 1998, claiming the benefit of applications filed in Japan on 31 October 1997 and 2 December 1998. The Specification is referred to as the "447 Specification," and is cited as "Spec." The real party in interest is listed as Asahi Kasei Kabushiki Kaisha. (Appeal Brief, filed 5 October 2006 ("Br."), 1.)

[2] Office action mailed 5 April 2006.

The inventors report that, in addition to the mechanical strength of a fabric, the tensile work at break of the fabric is "an extremely important factor." (Spec. 4, ll. 20-28.) Fabrics meeting desired characteristics are reportedly obtained using polyamide fibers containing copper compounds in a specified amount, in which the product of the fineness of the warp or weft and the weave density does not exceed a certain value. (*Id.* at ll. 29-37.) Claim 17, the broadest independent claim, reads:

> 17. An air bag comprising
>
> a woven fabric composed of polyamide fiber yarns containing a copper compound in a mixture of a halogenated alkali metal, the copper compound selected from a group consisting of a copper salt and a halogenated copper, and having a copper concentration in the range of 30 to 200 ppm, and
>
> the polyamide fiber yarns containing a plurality of single filaments,
>
> each filament having a fineness in the range of 1 to 3.3 decitex,
>
> *the yarns having a yarn fineness in the range of 66 to 167 decitex*,
>
> *wherein the product of fineness of the warp or weft of the fabric multiplied by the weave density of the fabric* being less than 16000 decitex•end or pick, respectively, /2.54 cm,
>
> the fabric having
>
> the *load at 15% elongation* in the range of 3 to 35 N/%/2.54 cm,
>
> the *tensile work at break* in the range of 7000 to 30000 N•%/2.54 cm, and
>
> a value of *fabric strength at break* in a range from 740 to 1010 N/2.54 cm.

(Br., Claims App. 2-3; indentation, paragraphing, and emphasis added.)

Remaining independent claims 9 and 10 add additional limitations that further define the air bag, but each includes all the limitations of claim 17, including the emphasized passages and numerical ranges.

The Examiner has maintained the following grounds of rejection:[3]

A. Claims 10, 11, 13, 15, and 17-20 stand rejected under 35 U.S.C. § 103(a) in view of the teachings of Toray.[4]

B. Claims 9, 14, and 16 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Toray and Smith.[5]

C. Claims 12 stands rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Toray and Mizuki.[6]

B. Discussion

Findings of fact throughout this Opinion are supported by a preponderance of the evidence of record.

The Examiner finds that Toray does not disclose fabrics having any of the properties emphasized in appealed claim 17, reproduced *supra*, nor the

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[3] Examiner's Answer mailed 16 July 2007 ("Ans."). The Examiner's statement of rejection erroneously includes claim 21, which was canceled by an amendment filed 19 May 2004.

[4] Takeo Nibu et al., *Base Fabric for Non-Coated Air Bags*, JP Hei 7-90747 (1995), applied for by Toray Co., Ltd. (USPTO trans.)

[5] Bradley W. Smith & Bradley D. Harris, *Controlled Deployment Driver's Side Air Bag*, U.S. Patent 5,378,019 (1995).

[6] Tatsuro Mizuki et al., *High-Strength Ultra-Fine Fiber Construction, Method for Producing the Same and High-Strength Conjugate Fiber*, U.S. Patent 5,637,385 (1997).

further properties required by dependent claim 11[7] or by dependent claim 15.[8] (Ans., sentence bridging 3-4.) On the evidentiary basis that Toray discloses non-coated woven fabrics for air bags containing copper and a halogenated metal meeting the required copper concentration, from multifilament yarns having a fineness of 3 denier, particularly fabrics having a certain covering factor, tensile strength, and fineness of yarn having a fineness of 500 denier or less, the Examiner concludes that it would have been obvious to arrive at the fabrics recited in the claims as a result of "routine optimization . . . depending on the desired end use of the product." (*Id.* at 4, 1st full para.)

As generally argued by Kami, the Examiner has failed to make adequate factual findings to support the conclusion of obviousness. Moreover, the Examiner has failed to articulate a reasonable explanation of why the claimed fabric would have been obvious in view of the teachings of Toray. The uncontested evidence of record indicates that the art of air bag manufacturing is well-developed and relatively sophisticated. Workers in the art recognize the goals of small packaging volume, high strength, and suitability to avoid injury to vehicle occupants, and they have endeavored to select materials to obtain the desired properties. However, the Examiner has not come forward with any credible evidence that the critical parameters

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[7] Claim 11 depends from claim 9 or claim 10 and requires that the fineness of weft multiplied by weave density of weft be larger than the fineness of warp multiplied by weave density of warp. (Br., Claims App. 2.)

[8] Claim 15 depends from claim 9 or claim 10 and requires that yarns forming the fabric have a tensile strength of 5.4 cN/decitex to 7.5 cN/decitex and a specified tensile strength. (Br., Claims App. 2.)

identified by Kami were recognized as being result-effective variables for any purpose. Nor has the Examiner come forward with any credible evidence that any combination of other art-recognized result-effective variables would necessarily, even if accidentally, have led workers to fabrics made from fibers having the properties recited in the appealed claims. Indeed, as set out in detail by Kami (Br. 7-11), Toray strongly suggests (even if it does not require) that a minimum fineness of yarn fibers greater than 210 deniers (said to be approximately 231 decitex) is necessary in practice to obtain desired mechanical properties for air bag fabrics. (Br. 7-8, *citing* Toray, paras. [0027] and [0028].) This minimum yarn fiber decitex value is significantly more than the range of 66 to 167 decitex recited in the appealed claims. The Examiner has failed to direct our attention to any credible evidence of record indicating that fibers having such a fineness would have been considered suitable for air bag manufacture.

The Examiner does not rely on the remaining references in any way that cures the defects of Toray.

We conclude that the weight of the evidence of record is against a prima facie case of obviousness.

C. Order

We REVERSE the rejection of claims 10, 11, 13, 15, and 17-20 under 35 U.S.C. § 103(a) in view of the teachings of Toray.

We REVERSE the rejection of claims 9, 14, and 16 under 35 U.S.C. § 103(a) in view of the combined teachings of Toray and Smith.

We REVERSE the rejection of claims 12 under 35 U.S.C. § 103(a) in view of the combined teachings of Toray and Mizuki.

REVERSED

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